

WHAT IS CLAIMED IS:

1. A rolling die for a ball screw, comprising:  
a cylindrical portion including a helical protrusion  
5 formed in an outer peripheral surface thereof for forming a  
helical ball groove in a raw material of a screw shaft of the  
ball screw; and  
a conical lead-in portion formed in one end portion of  
the cylindrical portion, the lead-in portion including a  
10 plurality of frustum-cone-shaped portions,  
wherein the contact angles of the frustum-cone-shaped  
portions with respect to the raw material of the screw shaft  
are each set so as to increase sequentially in the order starting  
at and from the frustum-cone-shaped portion adjoining the  
15 cylindrical portion.

2. The rolling die for a ball screw as set forth in claim  
1, wherein the lead-in portion includes a first  
frustum-cone-shaped portion adjoining the cylindrical portion  
20 and a second frustum-cone-shaped portion adjoining the first  
frustum-cone-shaped portion.

3. The rolling die for a ball screw as set forth in claim  
2, wherein a contact angle of the first frustum-cone-shaped  
25 portion is set at an angle of  $0.4^\circ$ , and a contact angle of the

second frustum-cone-shaped portion is set at an angle of  $4^\circ$ .

4. The rolling die for a ball screw as set forth in claim  
2, a run-off portion is formed in the other end portion of the  
5 cylindrical portion, a contact angle of the run-off portion  
is set not more than the contact angle of the first  
frustum-cone-shaped portion.

5. The rolling die for a ball screw as set forth in claim  
10 2, wherein an axial-direction length L of the first  
frustum-cone-shaped portion is set in the range of  $\kappa \leq L \leq 10\kappa$ ,  
where  $\kappa$  expresses the moving amount of the raw material of the  
screw shaft per 1/2 rotation.